

WHAT IS CLAIMED IS:

1 1. A method for controlling exhaust gas recirculation of an
2 internal combustion engine comprising:

3 determining a steady state condition at which an intake manifold
4 temperature is below an intake manifold critical temperature at which condensation
5 could occur in said intake manifold;

6 sensing at least one of a plurality of parameters taken from the group
7 of operating conditions consisting of ambient temperature, intake manifold
8 temperature, EGR mass rate, engine speed and intake manifold pressure to form a
9 first set of values including each said at least one parameter;

10 determining at least one parameter value for a second set of values
11 for said operating conditions taken from said group;

12 processing an equation wherein IMT_Critical is predicted as a
13 function of said group of operating condition variables by occupying variables with
14 said first and second sets of values; and

15 selecting a command in response to said processing.

1 2. The invention as described in claim 1 wherein said
2 determining comprises assuming a fixed value for said parameter value.

1 3. The invention as described in claim 1 wherein said sensing
2 comprises sensing each of said group of operating conditions to form a combination
3 of preferred variables defining critical intake manifold pressure as a linear function
4 of said preferred variables.

1 4. The invention as described in claim 1 wherein said
2 determining comprises assigning a value from a memory or storage of data.

1 5. The invention as described in claim 4 wherein said assigning
2 comprises reading a look-up table.

1 6. The invention as described in claim 1 wherein said selecting
2 comprises switching said engine into exhaust gas recirculation mode.

1 7. The invention as described in claim 1 wherein said selecting
2 comprises bypassing a cooler with exhaust gas recirculated to an intake manifold.

1 8. The invention as described in claim 1 wherein said processing
2 comprises calculating critical intake manifold pressure in a linear equation.

1 9. A computer readable storage medium having data stored
2 therein representing instructions executable by a computer to control a compression
3 ignition internal combustion engine installed in a vehicle to perform adjustment in
4 an exhaust gas recirculation operation, the computer readable storage medium
5 comprising:

6 instructions for establishing a combination of parameter values for a
7 set of engine operating conditions;

8 instructions for calculating an intake manifold temperature prediction
9 in response to said establishing by occupying variables of an equation with said
10 combination of parameter values;

11 instructions for comparing said intake manifold temperature
12 prediction with an intake manifold temperature indication; and

13 instructions for selecting a command in response to said comparing
14 that adjusts exhaust gas recirculation operation of the engine in response to said
15 comparing.

1 10. The invention as described in claim 9 wherein said instructions
2 for establishing including instructions for quantifying a sensed operating condition
3 of said engine.

1 11. The invention as described in claim 10 wherein said sensed
2 operating condition is taken from the group consisting of ambient temperature,
3 intake manifold temperature, EGR mass rate, engine speed and intake manifold
4 pressure.

1 12. The invention as described in claim 9 wherein said response
2 to said comparing is dependent upon said intake manifold temperature being greater
3 than said intake manifold temperature prediction.

1 13. The invention as described in claim 9 wherein said adjusting
2 is switching on exhaust gas recirculation when said intake manifold temperature is
3 greater than said intake manifold temperature prediction.

1 14. A system for controlling a compression ignition internal
2 combustion engine in a vehicle with an exhaust gas recirculation operating mode
3 comprising:

4 at least one sensor for determining at least one of a plurality of
5 parameters taken from the group of operating conditions consisting of ambient
6 temperature, intake manifold temperature, EGR mass rate, engine speed and intake
7 manifold pressure to form a first set of values;

8 an occupier determining a combination of values including said first
9 set of values;

10 a processor for calculating intake manifold critical temperature as a
11 function of said combination of values; and

12 a controller for switching exhaust gas recirculation mode operation
13 when said calculated critical temperature exceeds a predetermined intake manifold
14 critical temperature at which condensation occurs in said intake manifold.